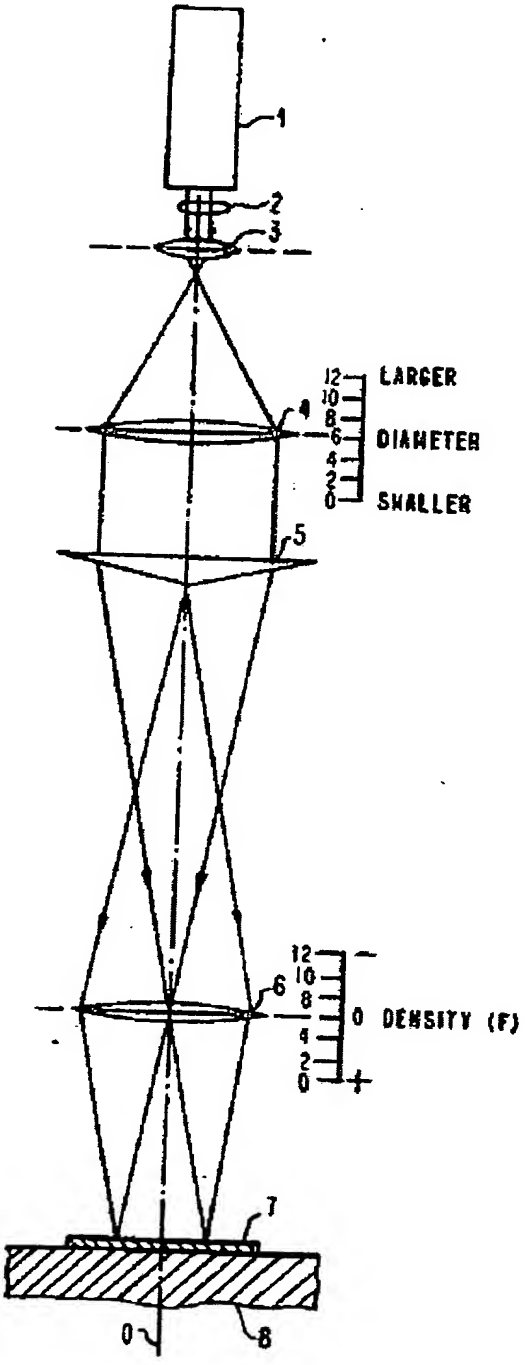
Apparatus for machining material

Patent number: DE2821883
Publication date: 1979-10-31
Inventor: SCHMACKPFEFFER ARNO DIPL-PHYS; MAKOSCH GUENTER; ZILLER JOERG; SCHEDEWIE FRANZ DIPL-PHYS DR
Applicant: IBM DEUTSCHLAND
Classification:
- international: B23K26/00
- european: B23K26/073; B23K26/073D; H01J37/30A4
Application number: DE19782821883 19780519
Priority number(s): DE19782821883 19780519

Also published as:
EP0005460 (A
US4275288 (A
JP54152299 (

Abstract not available for DE2821883
Abstract of corresponding document: **US4275288**

The gaussian energy distribution common to all laser beams is a serious handicap in most laser beam applications for machining material, such as for drilling, welding and the like. This is especially true in welding extremely thin metal sheets, as in the manufacture and assembly of the transducers of modern magnetic disk files. According to the subject invention, a laser beam is directed to a glass cone or axicon which converts the gaussian energy distribution of the laser beam to one more uniform in cross-section. Depending on the distance of the workpiece from the exit side of the axicon, the energy distribution of the radiation impinging onto the workpiece will be either uniform, saddle shaped or annular cross-section. It has been discovered that saddle shaped or annular energy distributions are optimal for welding very thin metal sheets by a laser beam since the heat dissipation in the center of a welding spot is a minimum and that at the periphery of the laser beam depends on the material, size and shape of the workpiece, which parameters can be matched by adjusting the distance between the axicon and the workpiece.



(51) Int. Cl.³ = Int. Cl.² Int. Cl.²: B 23 K 26/00

(19) BUNDESREPUBLIK DEUTSCHLAND

DEUTSCHES PATENTAMT

≙ US 4275288

DE 28 21 883 C 2

(11) Patentschrift 28 21 883

(21) Aktenzeichen: P 28 21 883.9-34
(22) Anmeldetag: 19. 5. 78
(43) Offenlegungstag: —
(44) Bekanntmachungstag: 31. 10. 79
(45) Ausgabetag: 17. 7. 80
Patentschrift stimmt mit der Auslegeschrift überein

(30) Unionspriorität:
(32) (33) (31) —

(54) Bezeichnung: Vorrichtung zur Materialbearbeitung

(73) Patentiert für: IBM Deutschland GmbH, 7000 Stuttgart

(72) Erfinder: Makosch, Günter, 7032 Sindelfingen; Schedewie, Franz, Dipl.-Phys. Dr.; Schmackpfeffer, Arno, Dipl.-Phys. Dr.; 7030 Böblingen; Ziller, Jörg, 7032 Sindelfingen

(56) Für die Beurteilung der Patentfähigkeit in Betracht gezogene Druckschriften:
DE-AS 20 12 718
DE-OS 24 46 862
US 37 05 768
Drake et al, K.H.: DVS-Berichte, 40, Löten und Schweißen in der Elektronik, Düsseldorf 1976, Kontaktieren von Halbleiterbauelementen mit Laserstrahlen mit nicht-gaußförmiger Intensitätsverteilung

DE 28 21 883 C 2

● 7. 80 030 229/414